Hall Ticket Number :										

R-15

Code: 5GC24

I B.Tech. II Semester Supplementary Examinations February 2022

Engineering Mathematics-II

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Find the area of a plate in the form of a quadrant of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1.$

   b) Evaluate $\int_0^{\frac{\pi}{2}}\int_0^{a\sin\theta}\int_0^{\frac{a^2-r^2}{a}} r\,dz\,dr\,d\theta$

OR

2. Change the order of integration in $\int_0^1\int_x^{\sqrt{2-x^2}}\frac{x}{\sqrt{x^2+y^2}}\,dy\,dx$ and hence evaluate it.

UNIT–II

3. a) Find the Laplace Transform of $\left(\sqrt{t}-\frac{1}{\sqrt{t}}\right)^3$

   b) Evaluate $\int_0^{\infty} e^{-t}\left(\frac{\cos at-\cos bt}{t}\right)dt$

OR

4. a) Find $L^{-1}\left\{\frac{s}{\left(s^2+a^2\right)^2}\right\}$ by convolution theorem.

   b) Find $L^{-1}\left\{\log\left(\frac{s+1}{s-1}\right)\right\}$.

UNIT–III

5. Solve $\left(D^2+9\right)x=\sin t$ using Laplace transform given that $x(0)=1, x\left(\frac{\pi}{2}\right)=1$.

OR

6. Solve $y''-3y'+2y=4t+e^{3t}, y(0)=1, y'(0)=1.$

UNIT–IV

7. a) Find the angle between the surfaces $x^2+y^2+z^2=9$ and $z=x^2+y^2-3$ at the point $(2,-1,2)$

   b) Find the directional derivative of $f(x,y,z)=xy^3+yz^3$ at the point(2,-1,1) in the direction of the vector I+2J+2K.

OR

8. Evaluate the line integral $\int_c (x^2+xy)dx+(x^2+y^2)dy$,where c is the square formed by the lines $y=\pm 1 \text{ and } x=\pm 1.$

UNIT–V

9. Verify Green's theorem for $\int_c (3x^2-8y^2)dx+(4y-6xy)dy$,where c is the boundary of the region bounded by x=0,y=0 and x+y=1.

OR

10. Verify Stoke's theorem for $\vec{f}=(2x-y)\vec{i}-yz^2\vec{j}-y^2z\vec{k}$ over the upper half surface of the sphere $x^2+y^2+z^2=1$ bounded by the projection of the xy-plane.

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Hall Ticket Number :										

R-15

Code: 5GC23

I B.Tech. II Semester Supplementary Examinations February 2022

Engineering Physics

(Common to CE, ME and CSE)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks
		UNIT–I	
1.	a)	Describe construction of optical fiber	6M
	b)	Write the application of optical fiber in communication system	8M
		OR	
2.	a)	Illustrate the procedure for finding Acceptance Angle and Numerical Aperture of Optical fiber	10M
	b)	Distinguish Interference and Diffraction of light	4M
		UNIT–II	
3.	a)	Show that FCC is closely packed than SC and BCC structures	10M
	b)	Draw the plane of miller indices of (111) and (121)	4M
		OR	
4.	a)	Define ultrasonics and write its properties	6M
	b)	Describe the production of ultrasonics by Inverse Peizo electric effect	8M
		UNIT–III	
5.	a)	Explain postulates of free electron model	6M
	b)	How the solids are classified on the basis of energy band theory	8M
		OR	
6.	a)	Define conductivity and drive its equation for metals	8M
	b)	Distinguish metals, semiconductors and insulators	6M
		UNIT–IV	
7.	a)	Explain Hall effect and write its applications	10M
	b)	What is photo diode explain it	4M
		OR	
8.	a)	Explain the diamagnetic nature of superconductors by Meissner's effect	8M
	b)	Mention the applications of superconductors	6M
		UNIT–V	
9.	a)	Explain Hysterisis loop of ferromagnet	6M
	b)	Derive magnetic moment of magnetic material through origin	8M
		OR	
10.	a)	Narrate the importance of nano materials by basic principles	6M
	b)	justify the importance of chemical vapour deposition technique by the synthesis of nano materials	8M

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Hall Ticket Number :										

R-15

Code: 5GC25

I B.Tech. II Semester Supplementary Examinations February 2022

Mathematical Methods-II

(Common to CSE & IT)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. a) Fit a straight line for the following data

x	1	2	3	4	5	6
y	6	4	3	5	4	2

7M

b) For the following data, fit a Parabola $y = a + bx + cx^2$.

x	2	3	6	8	10
y	3.07	12.85	31.47	57.38	91.29

7M

OR

2. a) Fit a straight line for the following data

x	1	2	3	4	5	6
y	6	4	3	5	4	2

7M

b) Fit a second degree polynomial to the following data by the method of least squares

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

7M

UNIT–II

3. a) Using Taylor's series method, compute the value of y at x=0.2 from $\frac{dy}{dx} = x + y$; $y(0) = 1$. 7M

b) Given $y' = x + \sin y$, $y(0) = 1$. Compute $y(0.2)$ with h=0.2 using Euler's Modified method. 7M

OR

4. a) Using Picard's method, find the value of y for x=0.4, given that $y' = x^2 + y^2$ $y(0) = 0$. 7M

b) Compute $y(0.1)$ and $y(0.2)$, if $y(x)$ is the solution of initial value problem $y' = y^2 + xy$, $y(0) = 1$ by Runge-Kutta method 7M

UNIT–III

5. a) Obtain the Fourier Series for f(x) = x in (0,2π) 7M

   b) Express $f(x) = x$ as half range sine series in $0 < x < 2$ 7M

OR

6. a) Find the Fourier series for the function f(x) = x in (-1,1) 7M

   b) Express $f(x) = ax + b$ as half range sine series in $0 < x < 1$ 7M

UNIT–IV

7. Find the Fourier sine and cosine transforms of $f(x) = 2e^{-5x} + 5e^{-2x}$ 14M

OR

8. Find the Finite Fourier sine and cosine transforms of $f(x) = x^2, 0 < x < l$ 14M

UNIT–V

9. a) Form a partial differential equation by eliminating the arbitrary function f from $z = f(x^2 + y^2)$ 7M

   b) Solve $p \tan x + q \tan y = \tan z$. 7M

OR

10. a) Form a partial differential equation by eliminating the arbitrary functions from $z = f(x + at) + g(x - at)$. 7M

    b) Solve $2\frac{\partial^2 u}{\partial x^2} - \frac{\partial u}{\partial y} = 0$ using the method of separation of variables 7M

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Hall Ticket Number :										

R-15

Code: 5G121

I B.Tech. II Semester Supplementary Examinations February 2022

C Programming and Data Structures

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. a) Using pointers write a C program which finds the maximum among the list of elements. 10M
   b) Write a C program to swap two numbers using pointers. 4M

OR

2. a) What is a pointer? What are the features of pointers? Write a C program to print address of a variable 7M
   b) Explain dynamic memory allocation functions in C in detail. 7M

UNIT–II

3. a) Write a C Program to sort the given array in descending order using Bubble Sort. 7M
   b) Write a C program to find the given element using linear searching. 7M

OR

4. a) Define Structures. Explain with an example how structure members are initialized and accessed 7M
   b) Write a C program to copy the contents from one file to another file. 7M

UNIT–III

5. What is a stack? How it can be represented in "C" using arrays? 14M

OR

6. a) What is Data Structure? Explain in detail about different type of data structures. 7M
   b) Write the steps for evaluating postfix expression 7M

UNIT–IV

7. What is a Doubly Linked List.? Explain different operations of a Doubly linked list with suitable examples. 14M

OR

8. Write a C program to implement the following operations on a singly Linked List
   i) Insert at beginning ii) deletion at end iii)Traversing a List 14M

UNIT–V

9. a) Define and describe the terms: Tree, Binary Tree, Complete Binary Tree and Degree of a tree. 7M
   b) Draw a complete undirected graph having five nodes. 7M

OR

10. Construct Binary search tree for the following elements: 67, 12, 45, 98, 80, 73, 7, 120, 85, 30, 42 then Delete 73, 67, 12, 98. 14M

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